



BIOLOGY
STANDARD LEVEL
PAPER 1

Thursday 11 May 2000 (afternoon)

45 minutes

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Answer all the questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.

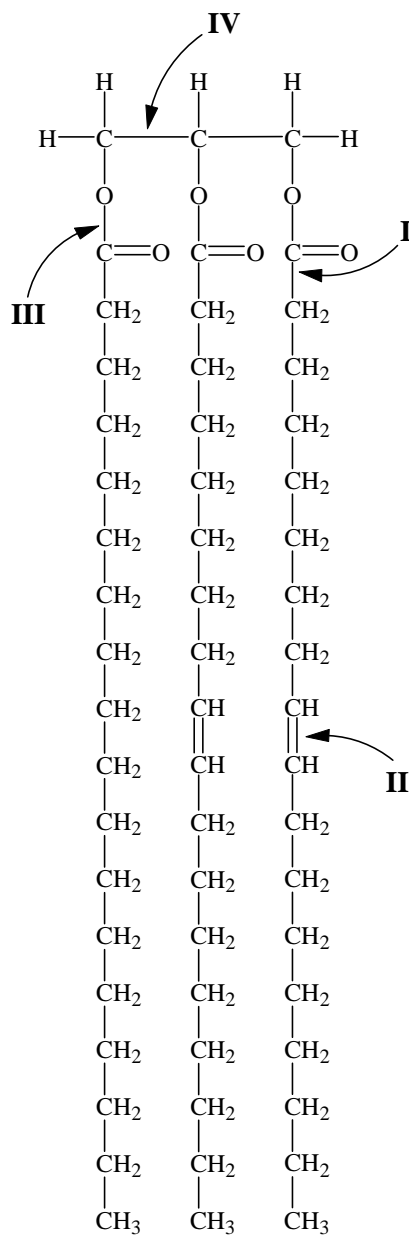
1. What is an organelle?
 - A. A specialised structure within a cell
 - B. A female organism
 - C. A structure found in the cytoplasm of prokaryotic cells
 - D. An organ of the female reproductive system

2. Which function is carried out by the flagellum of a prokaryote?
 - A. Movement of food towards the cell
 - B. Movement of the whole cell from one place to another
 - C. Movement of naked nucleic acid inside the cell
 - D. Movement of water around the cell to speed up gas exchange

3. What is needed for osmosis to occur?
 - I. a concentration gradient of solutes
 - II. a partially permeable membrane
 - III. a supply of ATP
 - A. I only
 - B. I and II only
 - C. I and III only
 - D. I, II and III

4. What causes the chromosomes of an animal cell to move to opposite ends of the cell during mitosis?
- A. microtubules
 - B. mesosomes
 - C. nuclear membranes
 - D. mitochondria
5. Nitrogen, phosphorus and sulfur are non-metallic elements. Are they needed by living organisms?
- A. Nitrogen is needed, but phosphorus and sulfur are not.
 - B. Nitrogen and sulfur are needed, but phosphorus is not.
 - C. Nitrogen and phosphorus are needed but sulfur is not.
 - D. Nitrogen, phosphorus and sulfur are all needed.

6. The diagram below shows a triglyceride.



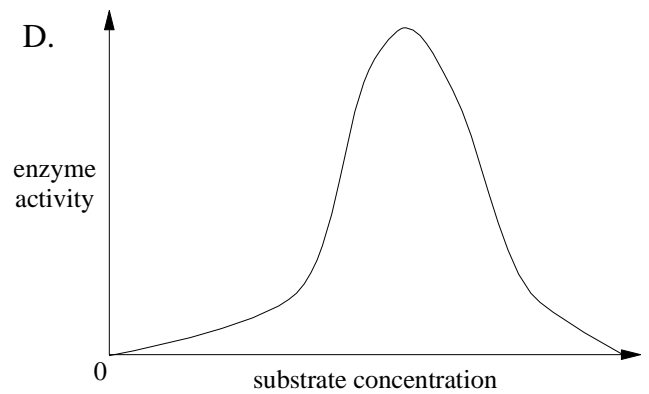
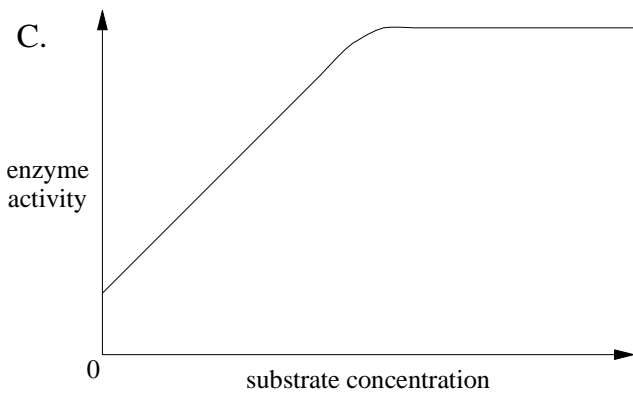
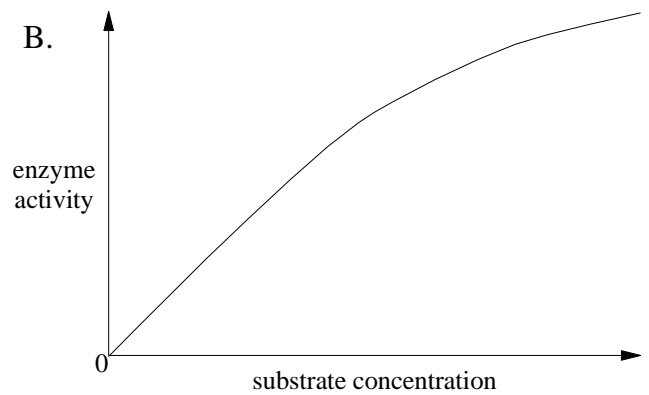
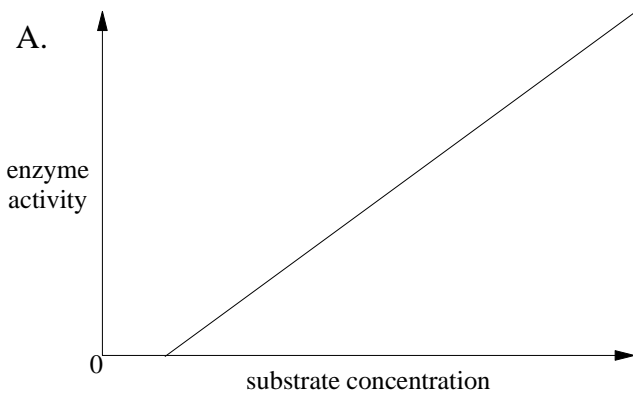
Which arrow points to a bond formed by condensation between a fatty acid and a glycerol?

- A. I
- B. II
- C. III
- D. IV

7. What is formed by the hydrolysis of dipeptides?

- A. monosaccharides
- B. polypeptides
- C. protease
- D. amino acids

8. Which graph shows the effect of substrate concentration on enzyme activity?



9. DNA is made up of three components: deoxyribose, phosphate and bases. What is the maximum number of components that deoxyribose is linked to in a DNA molecule?

- A. One phosphate and one base
- B. Two phosphates and one base
- C. One phosphate and two bases
- D. Two phosphates and two bases

10. What is replicated by a semi-conservative process?
- A. messenger RNA (mRNA) only
 - B. messenger RNA (mRNA) and transfer RNA (tRNA) only
 - C. messenger RNA (mRNA), transfer RNA (tRNA) and DNA
 - D. DNA only
11. In which process is transfer RNA (tRNA) involved?
- A. Recombination
 - B. Replication
 - C. Transcription
 - D. Translation
12. What technique is used in DNA profiling?
- A. gene transfer
 - B. gene therapy
 - C. gel electrophoresis
 - D. electron microscopy
13. Base deletion and substitution are types of gene mutation. What base sequence could be formed by these types of mutation from the sequence ACGGTCTAT?

	Deletion of a codon	Substitution of one base
A.	ACGGTCT	ACGGUCUAU
B.	ACCTAT	ACGCTCTAT
C.	CGGTCTT	GCAGTCTAT
D.	GTCTAT	ACGGTCTATA

14. In which stage in meiosis is the chromosome number reduced from diploid to haploid?
- A. During pairing of chromosomes in the first division of meiosis
 - B. During pairing of chromosomes in the second division of meiosis
 - C. When chromosomes move to opposite ends of the cell during the first division of meiosis
 - D. When chromosomes move to opposite ends of the cell during the second division of meiosis
15. Huntington’s chorea is a rare degenerative disease which usually develops when a person is between 30 and 45 years of age and leads to death within a few years. It is caused by a dominant allele.

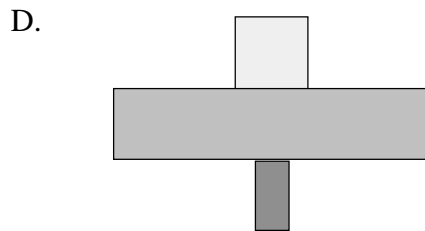
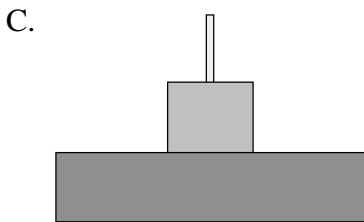
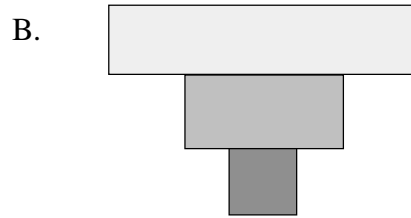
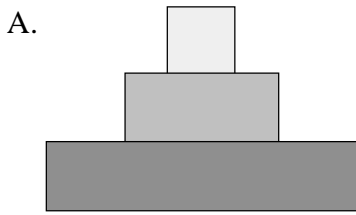
If one parent of two children develops Huntington’s chorea, but the other parent does not, what is the probability that both of the children will develop the disease?

- A. $\frac{1}{16}$
 - B. $\frac{1}{4}$
 - C. $\frac{9}{16}$
 - D. $\frac{3}{4}$
16. The pattern of inheritance of sex-linked genes is the same in *Drosophila* as in humans. Eye colour in *Drosophila* is controlled by a sex-linked gene. The allele for red eye is dominant over the allele for white eye. A red eyed male mates with a white eyed female. Which eye colours are found in the offspring?

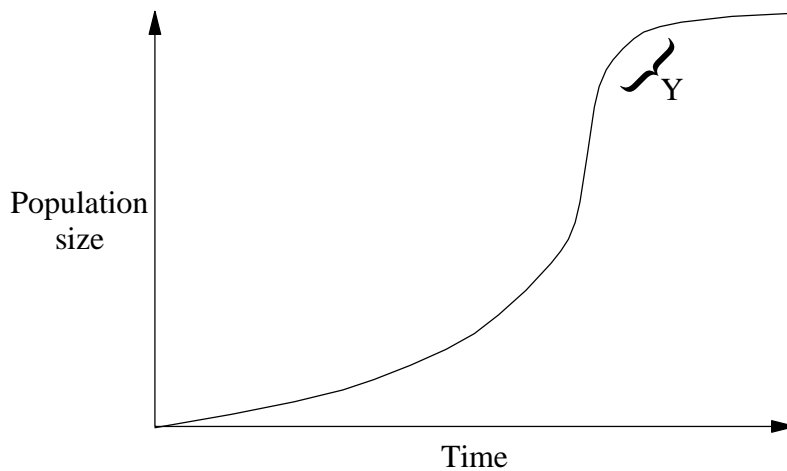
	Male offspring	Female offspring
A.	all red	all red
B.	all red	all white
C.	all white	all red
D.	50% red and 50% white	50% red and 50% white

17. What is a disadvantage of genetic screening?
- A. Cloning of human embryos is encouraged.
 - B. Research into genetic diseases is encouraged.
 - C. People who find out that they have a genetic disease may become depressed.
 - D. More children with genetic diseases will be born.
18. In ecology a series of terms is used, each of which includes more species than the previous one. What is this series?
- A. biosphere population community
 - B. population community biosphere
 - C. community biosphere population
 - D. community population biosphere
19. One aspect of a plant, known as *Eritrichium nanum* (the Glory of the Alps), is described in the following passage.
- “*Eritrichium nanum* is found at high altitude in mountains of the Northern Hemisphere. It grows in small cracks in either sandstone or dolomitic limestone rock.”
- What is the aspect described?
- A. community
 - B. ecology
 - C. ecosystem
 - D. habitat

20. What is the expected shape of a pyramid of energy for a food chain that consists of trees, leaf-eating beetles and birds that eat the beetles?



21. The graph below shows a sigmoid population growth curve, for a population in which there was no migration.



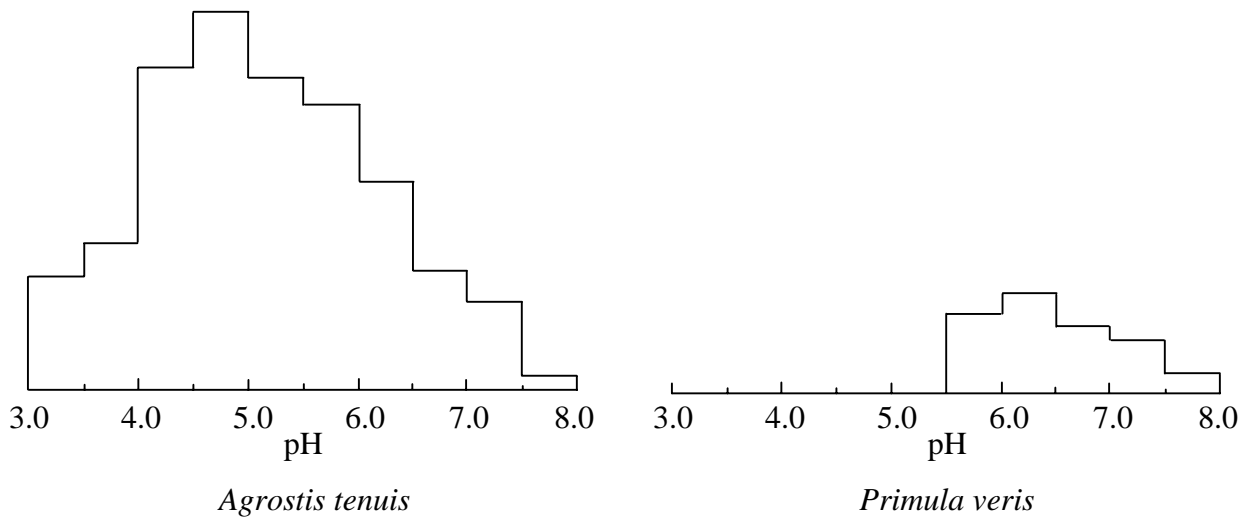
Which statement correctly describes the population during the phase marked Y?

- A. natality is decreasing or mortality is increasing
- B. mortality is decreasing or natality is increasing
- C. mortality and natality are both increasing but natality is increasing more rapidly
- D. mortality and natality are both decreasing but mortality is decreasing more rapidly

22. What is **essential** for natural selection to occur?

- A. variation between members of a species
- B. a large population size
- C. a high mortality rate
- D. environmental change

23. The soil pH of sites where *Agrostis tenuis* and *Primula veris* grow is shown in the frequency distributions below.



What is a difference between the two sets of ecological data?

- A. The mode for the sites where *Agrostis tenuis* grows is higher.
- B. The median for the sites where *Agrostis tenuis* grows is higher.
- C. The standard deviation for the sites where *Agrostis tenuis* grows is higher.
- D. A more random sample of sites was used for *Agrostis tenuis*.

24. What are the sources in humans of the digestive enzymes shown in the table?

	Amylase	Lipase
A.	mouth or stomach	liver
B.	stomach or liver	pancreas
C.	liver or pancreas	liver
D.	pancreas or mouth	pancreas

25. The diagram below shows some of the organs of the human body.

Which organ is the liver?

- A. I
- B. II
- C. III
- D. IV

26. Two of the chambers of the heart have relatively thin walls, one has thick walls and one has very thick walls. What is the relative thickness of the walls of each of the chambers?

	Thin walls	Thick walls	Very thick walls
A.	left and right ventricles	left atrium	right atrium
B.	left and right ventricles	right atrium	left atrium
C.	left and right atria	left ventricle	right ventricle
D.	left and right atria	right ventricle	left ventricle

27. What feature is found in capillaries, but not in arteries or veins?
- A. pores
 - B. elastic fibres
 - C. valves
 - D. muscle fibres
28. Why is infection with HIV (human immunodeficiency virus) associated with many different **symptoms**?
- A. People infected with HIV have different life-styles.
 - B. HIV attacks many different cells in the body causing many of the body's systems to stop functioning properly.
 - C. The immune system stops functioning properly so many different disease-causing organisms can invade the body.
 - D. People infected with HIV do not always develop AIDS.
29. What is placed into the uterus after the process of *in vitro* fertilisation (IVF)?
- A. eggs
 - B. sperm
 - C. embryos
 - D. fetuses

30. Which hormones control the contraction of the muscle in the uterus wall?
- A. oestrogen inhibits it and progesterone stimulates it.
 - B. progesterone inhibits it and oxytocin stimulates it.
 - C. oxytocin inhibits it and FSH stimulates it.
 - D. FSH inhibits it and oestrogen stimulates it.
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